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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/882,614	06/15/2001	Seung Hyeon Rhee	2080-3-27	8481

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LEE, HONG, DEGERMAN, KANG & SCHMADEKA, P.C.
801 SOUTH FIQUEROA STREET
14TH FLOOR
LOS ANGELES, CA 90017

EXAMINER

NATNAEL, PAULOS M

ART UNIT	PAPER NUMBER
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2614

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DATE MAILED: 10/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

09/882,614

Applicant(s)

RHEE, SEUNG HYEON

Examiner

Paulos M. Natnael

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims **1,2,4,5, 12,13,15** are rejected under 35 U.S.C. 102(e) as being anticipated by **De Haan, et al. 6,034,734**.

Considering claim **1**, De Haan discloses all claimed subject matter, note;

a) a field motion estimator that estimates field motions between a current field and reference fields, said reference fields being prior or next to said current field, is met by motion estimator 13, Fig.1;

b) a field motion compensator that restores a missing line of said current field using information given from an optimal reference field if said optimal reference field unevenly matches to said current field, said optimal reference field being one of said reference fields having the shortest distance to said current field, is met by Motion compensation stage 7, Fig.1;

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Considering claim **2**, the apparatus of claim 1, further comprising: a linear interpolator that restores said missing line of said current field by linearly interpolating lines located adjacent to said missing line in said current field if said optimal reference field evenly matches to said current field, is met by Motion compensation stage 7, Fig.1;

Considering claim **4**, the apparatus of claim 1, further comprising: a field buffer that stores said current field and said reference fields and provides them to said field motion estimator and said field motion compensator, is met by field Memory 5 and 11, fig. 1;

Considering claim **5**, the apparatus of- claim 1, wherein said field motion estimator performs its computations in a vertical direction, is met by the disclosure that "solution (3) is based on the assumption that it is possible at some time to have a perfectly de-interlaced picture in a memory. Once this is true, the picture is used to de-interlace the next input field. With motion compensation, this solution can be perfect as the de-interlaced picture in the memory allows the use of SRC-theory also in the vertical domain." (col. 3, lines 59-64)

Claims **12,13,15** are method claims of claims 1,2,4, respectively, and thus Claims 12,13, and 15 are rejected for the same reasons as claims 1,2 and 4.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims **3,6-11,14,16-20** are rejected under 35 U.S.C. 103(a) as being unpatentable over De Haan et al, **6,034,734**.

Considering claim **3**, the apparatus of claim 2, further comprising: an edge-preserving filter for smoother slanting lines of an image of said image signals.

The reference of De Haan et al. does not specifically disclose an edge-preserving filter. However, Examiner takes Official Notice in that smoothing lines of an image with filtering and other similar techniques is well known in the art and therefore, it would have been obvious to the skilled in the art to modify the reference of De Haan et al. by providing such a filter so that the overall appearance of the video image is improved.

Considering claim **6**,

a) a field motion estimator that estimates field motions between a current field and reference fields, said reference fields being prior or next to said current field, is met by motion estimator 13, Fig.1;

b) a field motion compensator that restores a missing line of said current field using information given from an optimal reference field if said optimal reference field unevenly matches to said current field, said optimal reference field being one of said reference fields having the shortest distance to said current field, is met by Motion compensation stage 7, Fig.1;

Except for;

- c) a frame motion estimator that estimates frame motions between adjacent frames using said progressively scanned image signals and said field motions estimated in said field motion estimator;
- d) a frame motion compensator that provides a new composite image between said adjacent frames using said frame motions estimated in said frame motion estimator.

Regarding c) and d), De Haan does not specifically disclose a frame motion estimator and a frame motion compensator. De Haan indicates that the processing may be done in both the field and frame. Specifically, De Haan discloses that "a time-recursive de-interlacing algorithm is proposed in which the lines that need to be interpolated are found by motion compensating the previously found de-interlaced output frame." (see col. 4, lines 18-29) Field and frame motion estimation and compensation techniques nonetheless are well known in the art.

Therefore, although field/frame motion estimation and compensation are well known in the art, it would have been obvious to one having ordinary skill in the art at the

time the invention was made to integrate the processing of frame/field motion estimation and compensation, since it has been held to be within the general skill of a designer in the art to make plural parts unitary as a matter of obvious engineering choice.

Considering claim 7, a linear interpolator that restores said missing line (If said current field by linearly interpolating lines located adjacent to said missing line in said current field if said optimal reference field evenly matches to said current field.

See rejection of claim 6(b);

Considering claim 8, the apparatus of claim 7, further comprising: an edge-preserving filter for smoother slanting lines of an image of said image signals.

See rejection of claim 3;

Considering claim 9, the apparatus of claim 6, further comprising: a field buffer that stores said current field and said reference fields and provides them to said field motion estimator and said field motion compensator, is met by field memory 5 and 11.

Considering claim 10, the apparatus of claim 6, further comprising: a frame buffer that stores said progressively scanned image signals and outputs said progressively scanned image signals to said frame motion estimator and said frame motion Compensator;

De Haan et al does not specifically disclose a frame buffer. However, Examiner takes an Official Notice in that a frame buffer to store a frame signal is well known in the art and therefore, it would have been obvious to the skilled in the art to modify the system of De Haan by providing a frame buffer to store or delay the signal before outputting it to further processing in the estimation or compensation devices.

Considering claim **11**, the apparatus of claim 6, wherein said field motion estimator performs its computations in a vertical direction.

See rejection of claim 5;

Considering claim **14**, see rejection of claim 3.

Claims **16-20** are method claims of claims 6-10, respectively, and thus Claims 16-20 are rejected for the same reasons as claims 6-10.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Mizusawa et al. U.S. Pat. No. 5,687,097 discloses an apparatus (fig.1) for generating field1, field2, frame motion vectors and performing motion compensation.

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Lim et al, U.S. Pat. No. 6,614,484 discloses a de-interlacing method for video signals based on edge-directional interpolation

Topper, U.S. Pat. No. 6,545,719 discloses concealing interpolation in a video interlaced to progressive scan converter.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paulos M. Natnael whose telephone number is (703) 305-0019. The examiner can normally be reached on 6:30am -3pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Miller can be reached on (703) 305-4795. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4750.

Paulos Natnael *Pmn*
September 18, 2003


MICHAEL H. LEE
PRIMARY EXAMINER